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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
JOHN F. KENNEDY FEDERAL BUILDING
BOSTON, MASSACHUSETTS 02203-0001

VIA FACSIMILE AND U.S. MAIL

April 27, 2000

Mr. Andrew T. Silfer
Corporate Environmental Programs
General Electric Company
100 Woodlawn Ave.
Pittsfield, MA 01201

Re: **Comments on GE's 12 August 1999 Addendum to their June 1999 Detailed Work Plan for On-Plant Consolidation Areas (OPCA), General Electric Pittsfield Housatonic River Site, Pittsfield, Massachusetts**

Dear Mr. Silfer:

The Environmental Protection Agency (EPA), with review and comment from the Massachusetts Department of Environmental Protection (DEP), has reviewed the 12 August 1999 Addendum prepared by General Electric (GE) in response to the Agencies' 6 July 1999 review of GE's June 1999 Detailed Work Plan for On-Plant Consolidation Areas. Our response is attached. The contents of the attachment generally correlate to GE's 12 August 1999 submittal. EPA has only provided additional comments on those GE responses that need additional clarification or which present continuing concerns. The original EPA comments, as presented in its 6 July 1999 review, are summarized in italics with our current position on GE's 12 August response following. In addition, GE specifically requested that we pay particular attention to surface water runoff calculations and GE's HELP model. Our responses to this request are provided in Comment No. 3 and Comment No. 32, respectively.

In order to expedite resolution of the aforementioned comments, GE should consider a meeting with the Agencies prior to providing a written response. The Agencies are withholding our approval of the addendum to the On-Plant Consolidation Area Detailed Work Plan until these issues are resolved. Understanding GE's desire to initiate the placement of material into the OPCA in May, written responses to the Agencies' concerns should be submitted as soon as possible. Until the On-Plant Consolidation Area Detailed Workplan is approved, GE shall not

place any material in the portion of the Hill 78 OPCA which extends south of the access road and/or in the Building 71 OPCA.

Should you have any questions regarding these comments, please do not hesitate to contact Michael Nalipinski at (617) 918-1268.

Sincerely,

Bryan Olson

Bryan Olson
GE/Housatonic Team Leader

cc: Michael Nalipinski, EPA
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Comments on GE's 12 August 1999 Addendum to their June 1999 Detailed Work Plan-On-Plant Consolidation Areas, General Electric Pittsfield Housatonic River Site, Pittsfield, Massachusetts

EPA Comment 3 - Surface Water Runoff Management

Revise to include a section in the Detailed Work Plan text and figures which discusses how surface water runoff will be managed. Discuss the interim and final drainage patterns/retention basins as appropriate.

Response to GE's 12 August Response:

BB&L states that retention basins will be constructed to attenuate and control peak runoff to "the extent practicable" to accommodate runoff resulting from a 25-year/24-hour storm event. Of the three basins described in the BB&L concept for stormwater management, only one (the basin located immediately south of the Building 71 Consolidation Area) is depicted on the drawings presented to date. It is assumed that calculations pertaining to the sizing of this basin, as well as routing of the 25-year design storm through its outlet structure, have been completed.

To date, the Agencies have not obtained for review any stormwater management calculations related to the retention basin(s), relocated storm sewer, swale sizing, etc. GE has indicated that the referenced 1990 HMM Associates report, which concludes that the existing capacity of hydraulic structures (presumably the 30-inch culvert under Merrill Road and the 36-inch culvert in the same vicinity), is insufficient to even accommodate a 10-year storm. BB&L states that as a result of this inadequacy, some modifications may be necessary to the design of the retention basins.

One question regarding the 1990 HMM Associates report is whether it offered any specific recommendations for the upgrading the existing culverts or hydraulic structures to accommodate storms of greater magnitudes.

GE shall provide the Agencies with the design drawings for the surface water runoff structures stormwater management calculations and with a copy of the 1990 HMM report for our review prior to initiating construction of the above-mentioned structures. Without the described stormwater management calculations or information from the referenced 1990 report, the Agencies cannot conduct a meaningful review or offer specific comments or

recommendations regarding the suitability or adequacy of the system or features proposed. Upon the Agencies' receipt and review of the design drawings and the 1990 report we will offer our comments regarding stormwater runoff management.

EPA Comment 10 - Subgrade Preparation

Page 5-11, Section 5.12: Reevaluate the diameter of deleterious material allowable in the consolidation area. Typically, the geotextile vendor has size requirements that should be adhered to. The puncture requirements shall be evaluated using GRI test methods.

Response to GE's 12 August Response:

Typically no deleterious material is permitted within 6 inches of any geosynthetic component. The procedure suggested by BB&L for preparing the subgrade is theoretically correct but implementing such a procedure may prove difficult. BB&L previously stated that they would remove all deleterious material from the subgrade soil; however, this is impractical. If a layer of clean fill is not to be placed on the sideslopes, a heavy (e.g., 16oz/yd2 or greater) nonwoven needlepunched geotextile shall be used as a cushioning layer between the prepared subgrade and the geomembrane. The cushioning geotextile shall be selected conservatively, assuming a piece of angular glass protruding from the subgrade surface.

With respect to the Consolidation Area floor, BB&L shall define the term "clean soil" to be used directly beneath the geomembrane. The particle size distribution must be specified and a puncture calculation performed to determine if there is any potential to damage the geomembrane. GRI Report #13, "A Design Methodology for the Puncture Protection of Geomembranes" describes a method to evaluate puncture potential of geomembranes.

EPA Comment 16 - Puncture Calculations

Section 6-8: The proposal to allow materials greater than 6 inches in the first lift seems excessive. Puncture calculations shall be provided that substantiate the appropriate particulate size which will not cause damage to the geosynthetic material. Use the GRI method to evaluate.

Response to GE's 12 August Response:

The geotextile puncture calculations presented use a procedure outlined in the textbook "Designing with Geosynthetics" by R.M. Koerner. Although not a GRI method, the procedure is acceptable. It is recommended that the puncture potential of the geomembrane also be evaluated. The contribution of any geotextiles in direct contact with the geomembrane shall be included.

EPA Comment 28 - Geomembrane Thickness

Figure 3: Define the thickness of the flexible membrane liner and sub base material. The EPA has recommended a 60-mil flexible membrane.

Response to GE's 12 August Response:

The EPA recommended a 60-mil thick geomembrane. The response states that a 60-mil thick geomembrane will be provided. To avoid possible confusion in the future, the method used to determine the geomembrane thickness shall be defined. The material thickness can be specified as a minimum thickness or as an average thickness. Specifying a minimum thickness would result in the geomembrane being at least 60-mil thick, whereas specifying an average thickness of 60 mil would result in material with a minimum thickness of about 54 mils. It is likely that material with an average thickness of 60 mil is adequate for the intended purpose.

EPA Comment 32- Leachate Generation (Geocomposite and Pipe Sizing)

Attachment A. Technical Drawings, A-5: Leachate pipes are shown which are 6-inch diameter with minimum slopes of 0.5%. No calculations are provided to substantiate pipe sizing or transmissivity of the drainage geocomposite for predicted leachate flows. In addition, pipe strength calculations should be provided for Consolidation Area loading either at a final grade or due to vehicular and equipment loads during construction or operations.

Response to GE's 12 August Response:

BB&L performed three HELP model analyses in support of pipe sizing and geocomposite calculations. Based on the information presented, several issues need to be addressed in regard to HELP model analysis. The selection of material texture 8 (ML soil type by USCS) from the HELP default menu may not be sufficient. It is our understanding that the river sediment is predominately sandy; therefore, a more granular material selection may better represent the river sediment. As a matter of consistency, the HELP model identifies the river sediment as a silty soil (ML), whereas page 1 of the pipe wall thickness calculation identifies it as a "saturated silty sand and gravel."

The rationale for selecting the two scenarios to model worst-case conditions is not clear. The Agencies are of the opinion that the worst-case condition would occur when only a small portion of the first lift of material has been placed in the consolidation area. Essentially, under this scenario, 100% of precipitation falling within the consolidation area footprint would need to be handled as leachate as there does not appear to be any provision for isolating "clean" rainwater from water that contacts in-place sediment. The scenarios

presented address a time in the future after significant filling has occurred. For example, using Condition B, which in the Agencies' opinion more closely represents the worst-case scenario, the volume of leachate that the pipe must convey should be determined by multiplying the calculated percolation/leakage through layer 1 of 4.89 inches/day by the total area of the landfill (AA + AB = 5.1 acres, as presented on page 2 of the leachate collection pipe size calculations in Appendix L). The resulting volume of leachate, Qtotal becomes approximately 1.05ft3/sec versus 0.219ft3/sec presented in the calculations, more than a fourfold increase. The pipe sizing calculations shall be revised accordingly to address the worst-case condition not a condition at some time in the future. An alternate approach would be to design the piping system based on a design storm event. From drawing A-5, it appears that all leachate generated within the consolidation area must be discharged through a single pipe. Therefore, this pipe must be able to convey sufficient flow so as to prevent a head build-up within the consolidation area in excess of 12 inches.

In regard to the transmissivity calculations, a more appropriate model would include a geonet/geocomposite and a geomembrane. Output from such a model using version 3.07 of the HELP model (latest version) would yield the volume of drainage collected from the geonet/geocomposite, maximum head build-up above the geomembrane and the location of the maximum head build-up from the drain point. Based on the drainage collected from the geonet/geocomposite, the required transmissivity can be determined. Additionally, the maximum drainage length was determined to be approximately 200 feet in the southernmost drainage area of the consolidation area as shown on drawing A-5. The calculation shall be revised using a more appropriate HELP model.

The EPA requests that GE shall provide an estimate of the leachate volume likely to be generated by dewatering sediment due to consolidation of the material be considered in the above calculations. Even though consolidation soils from the river will be required to pass the "paint filter test," there will be some moisture that could contribute to leachate generation. This volume of leachate will be in addition to leachate generated by precipitation.

There appears to be a conflict between the drawings and the apparent intent of the leachate collection piping system. A pipe running in an east-west direction across the consolidation area is identified as a perforated pipe while the collection pipe running along the toe of the western berm appears to be a solid wall pipe (see drawing A-5). Details 1 and 2 on drawing A-8 seem to verify these materials and conditions. In this regard, please clarify how leachate will be collected from the two southerly drainage areas within the consolidation area and discharged from the area.

Depending on how the revised pipe sizing calculations are prepared, it may be practical to use various pipe diameters to transmit flow to the exit point.

In regard to geocomposite testing, the creep potential of the material shall be considered. The specification should require the geocomposite to retain a certain percentage of its original thickness after a specified time under a given load. Manufacturers may have data available from long-term tests that reflect the creep potential of their product(s). It is also recommended that transmissivity tests be preformed using a number of hydraulic gradients in order to span the range of possible gradients. Increasing or decreasing the gradient may cause flow to become either turbulent or laminar, changing the flow characteristics of the geocomposite.

EPA Comment 33 - Veneer Stability

Provide calculations to demonstrate that adequate veneer stability exists between the respective interface layers of the components of the final cover systems on the 33% slope. The calculated requirements should be verified using proposed materials by testing in accordance with ASTM D-5321. The tests to evaluate the interface friction requirements may include Koerner, Hwu, Giroud, Bachus and Bonaparte methods.

Response to GE's 12 August Response:

The veneer slope stability analysis presented to address EPA Comment 33 is only partially complete. The analysis does not include the influence of potential seepage head build-up within the cover soils on the consolidation area sideslopes. It is recommended that a fully saturated condition be evaluated given the potential for the formation of ice dams at the toe-of-slope or ice lenses within the drainage composite on the sideslopes due to a thickness of cover soil less than the anticipated frost depth for the location. The formation of ice dams and/or frost lenses could cause water to pond within the cover soil, thus inducing destabilizing hydrostatic forces. (NAVFAC DM-7.1 suggests an extreme frost depth for the location of approximately 50 inches). The analysis shall be revised to include this condition. A procedure presented by Giroud, Bachus and Bonaparte can be used to evaluate veneer stability considering seepage forces.

The cohesive strength value of 50 psf should be justified/clarified. Is this value internal to the soil mass or is it actually an adhesion value between the cover soil and the upper geotextile of the drainage composite? Will the project specifications require the cover soil to have a cohesive strength of not less than 50 psf? GE shall perform direct shear tests in accordance with ASTM D-5321 on all critical interfaces.

Based on Figure 3 of Attachment K, it appears the geomembrane will be placed directly on natural (soil) materials. This being the case, the potential for slippage between the geomembrane and the soil material should be evaluated. Slippage between the geomembrane

and the underlying soil material could result in tensioning of the geomembrane and possible failure of the material.

EPA Comment 36 - Frost Damage

As previously commented, there are no calculations provided to substantiate that the proposed thickness (e.g., min. 2 feet) of the final cover system will provide adequate protection from frost damage of the underlying geosynthetics. The preferred method to evaluate frost protection issue is the Modified Berggren Equation.

Response to GE's 12 August Response:

The Agencies acknowledge receipt of several articles related to frost damage of geosynthetics. In general, the articles suggest that geosynthetics are not susceptible to frost damage. A concern not addressed by the articles directly is the potential for water to freeze within the drainage composite, subsequently resulting in a potential increase in hydrostatic pressure within the protective cover soil which could result in cover soil instability. In an article provided to BB&L by Carmo Environmental Systems, Inc. from a draft EPA document, the following statement is presented:

> *"It is advisable to prevent the drainage layer (if one is present) from freezing as well, particularly on relatively steep side slopes. If the drainage layer freezes, its function is destroyed for part of the year. During the thaw period, it is particularly important that the drainage layer function properly, i.e., drain from the toe, and that the protection layer be sufficiently thick to provide the protection that is required."*

In light of this statement, the Agencies strongly recommend that BB&L re-evaluate the cover soil thickness and potential veneer instability of the cover soil mass.

Attachment A - Area Subject to Geophysical Survey, Hill 78 Consolidation Area

Response to GE's 12 August Response:

In general, GE needs to provide additional information concerning the proposed geophysical survey along the perimeter of the Hill 78 Landfill. The following is a list of specific comments concerning the proposed geophysical surveys:

With regard to surveying a 50-foot-wide strip, it is recommended that the coverage be expanded to a 200-foot-wide strip with approximately 100 feet of the survey area located

either side of the area subject to consolidation. This will enhance the lateral resolution of the boundary.

The Addendum to the June 1999 Work Plan includes surveying a 25-foot by 25-foot area, centered on H78B-8R. GE did not specify the geophysical methods (EM-31/61, Mag, and/or GPR) they propose to use at H78B-8R.

How will the survey be designed (transects perpendicular to axis of boundary, intervals between transects)?

Fifty-foot transects should be extended as needed (based on field readings) to obtain sufficient data on either side of the area subject to consolidation.

GE shall submit a written proposal and obtain Agency approval for the geophysical survey 30 days prior to the initiation of field work. The geophysical survey must be completed prior to the Hill 78 OPCA expanding south of the current access road.

Attachment B - Proposed for Future Groundwater Monitoring
Hill 78 and Bldg. 71 Consolidation Areas

Response to GE's 12 August Response:

Three additional wells on the eastern side of the General Dynamics parking lot (Unkamet Brook - Building OP-2 area) shall be added to the groundwater level-monitoring program to provide additional groundwater flow data east of the Consolidation Areas. No additional groundwater sampling would be necessary.

On Figure 3, GE shows a groundwater flow trough southwest of the Hill 78 Landfill. The area is dashed on the map due to limited well monitoring in that area. This map shows the potential for contaminants from the landfill and especially well H78B-8R to move preferentially in that direction - undetected by the proposed well monitoring network. The EPA may require additional monitoring wells in that location based upon the results of the geophysical survey and other design factors e.g., groundwater mounding, etc..

Appendix B, Section 2.2. Review the well installation logs presented in Appendix A and the top of till contours presented in Attachment C. The comparison of these data indicates that the OPCA monitoring wells are either not screened within a confining layer or within till. Therefore, dense non-aqueous phase liquids, if present, would likely not be detected by the monitoring program. GE shall propose a strategy for resolving this discrepancy.

Appendix B, Table 3. Provide a note indicating whether or not samples were filtered or unfiltered. Also, the inorganic analytes listed on Table 3 include only arsenic, barium, and zinc. GE shall present the results for the remaining inorganic analytes required by Appendix IX+3 analysis.

Appendix B, Section 2.5, Page 2-3. GE shall provide copies of the laboratory analytical data sheets, along with a quality assurance/quality control (QA/QC) summary report indicating whether or not the analytical data meet the QA/QC requirements set forth by GE's Revised Sampling and Analysis Plan/Data Collection and Analysis Quality Assurance Plan, October 1998 (pending revisions).

Appendix B, Section 3.2, Page 3-1. GE indicates that both filtered and unfiltered groundwater samples will be collected for PCB and metal analyses. Were both unfiltered and filtered samples collected during the baseline monitoring program for PCBs and metals? Subsequent groundwater monitoring events should be consistent to ensure proper comparisons of data.

Appendix B, Section 3.2, Page 3-1. GE shall sample all OPCA monitoring wells for PCDDs/PCDFs. Insufficient data have been collected to date to exclude analysis of these parameters at all OPCA monitoring wells.

Appendix B, Section 3.4, Page 3-2, 3rd Paragraph. GE shall provide a rationale for why a Method 2 GW-2 standard should not be developed subject to EPA approval.

Appendix B, Section 3.4, Page 3-2, 4th Paragraph. GE shall present its rationale to EPA for why a Method 2 GW-3 standard was not developed subject to EPA approval.

Appendix B, Section 3.4, Page 3-2, 5th Paragraph. Consistent with Attachment H of the SOW, the site-specific risk evaluation shall consider EPA or MCP risk assessment guidance.

Appendix B. NAPL performance standards need to be developed to address NAPL if detected in the OPCA monitoring well network.

Appendix B, Section 3.5, Page 3-3, 2nd Paragraph. The notification requirements for GW-2 groundwater exceedances do not apply to the OPCA monitoring. There are no and will not be any school or residential structures within 30 feet of any OPCA monitoring point. GE shall propose and obtain the Agencies' approval for a more practical notification requirement.

Appendix B, Section 3.5, Page 3-4. Exceedance of a UCL would likely indicate a "statistically significant increase" in dissolved-phase constituents for any OPCA monitoring well, and therefore, GE shall perform the same activities identified for statistically significant

increases in dissolved-phase constituents. Revise the beginning of the 4th paragraph on page 3-4 as follows: "If a statistically significant increase or UCL exceedance..."

Appendix B, Section 3.7, Page 3.5. Any proposed modifications to the monitoring program are subject to EPA approval.